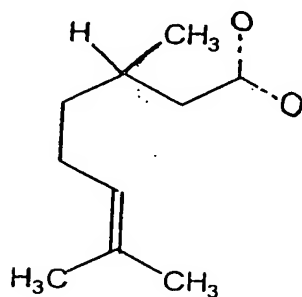
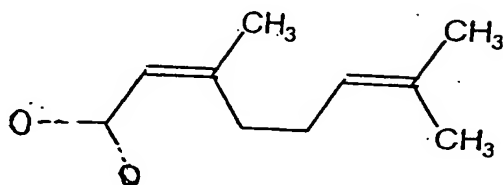


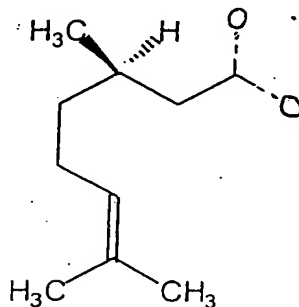
Patent Claims

1. Insect repellent, containing at least one acetal or semi-acetal of an acyclic terpene (C_{10}), wherein the acetal or semi-acetal radicals exhibit 1 to 15 carbon atoms.
2. Use of at least one acetal or semi-acetal of an acyclic terpene (C_{10}), wherein the acetal or semi-acetal radicals exhibit 1 to 15 carbon atoms, as insect repellent.
3. Insect repellent or use according to Claim 1 or 2, wherein the acetal or semi-acetal groups exhibit 1 to 12 carbon atoms.
4. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal radicals are acyclic.
5. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal radicals exhibit a cyclic unit.
6. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal radicals are in each case saturated.
7. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal radicals are in each case single or double unsaturated.
8. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal radicals themselves represent a terpene radical (C_{10}).
9. Insect repellent or use according to one of the above claims, wherein the acetal radicals are joined together and form a cyclic acetal, preferably with 1 to 12, especially preferably with 2 to 5 and most preferably with 3 carbon atoms in the acetal unit.

10. Insect repellent or use according to one of the above claims, wherein the terpene (C₁₀) exhibits one of the following structures:



11. Insect repellent or use according to Claim 9, wherein the terpene (C₁₀) exhibits the following structure:



12. Insect repellent or use according to one of the above claims, wherein the acetal or semi-acetal is selected from octadienal dialkylacetal, octenal dialkylacetal, octadienal octadienylacetal, octenal octadienylacetal, octenal octenylacetal, octadienal octenylacetal, octadienal-p-menthenylacetal, octenal-p-menthenylacetal, 2-heptadienyl-1,3-dioxane, 2-heptadienyl-1,3-dioxol, 2-heptenyl-1,3-dioxane, 2-heptenyl-1,3-dioxol or a mixture of them.
13. Insect repellent or use according to Claim 12, wherein the octadienal dialkylacetal is a cis-3,7-dimethyl-2,6-octadienal-dialkylacetal (neral dialkylacetal, Structure 1) with straight-chained, branched, saturated or unsaturated C1 - C15 alkyl radicals (preferably methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, pentyl, hexyl, octyl, decyl and dodecyl).
14. Insect repellent or use according to Claim 12, wherein the octadienal dialkylacetal is a trans-3,7-dimethyl-2,6-octadienal-dialkylacetal (geranial dialkylacetal, Structure 2) with straight-chained, branched, saturated or unsaturated C1 - C15 alkyl radicals (preferably methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, pentyl, hexyl, octyl, decyl and dodecyl).
15. Insect repellent or use according to Claim 12, wherein the octenal dialkylacetal is an R-(+)-3,7-dimethyl-6-octenal-dialkylacetal ((+)-citronellal dialkylacetal, Structure 3) with straight-chained, branched, saturated or unsaturated C1 - C15 alkyl radicals (preferably methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, pentyl, hexyl, octyl, decyl and dodecyl).
16. Insect repellent or use according to Claim 12, wherein the octenal dialkylacetal is an S-(-)-3,7-dimethyl-6-octenal-dialkylacetal ((-)-citronellal dialkylacetal, Structure 4) with straight-chained, branched, saturated or unsaturated C1 - C15 alkyl radicals

(preferably methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, pentyl, hexyl, octyl, decyl and dodecyl).

17. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a cis-3,7-dimethyl-2,6-octadienal-trans-3,7-dimethyl-2,6-octadienyl-acetal (neral-geranylacetal, Structure 5a) or a cis-3,7-dimethyl-2,6-octadienal-di(trans-3,7-dimethyl-2,6-octadienyl)-acetal (neral digeranylacetal, Structure 5b).
18. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a cis-3,7-dimethyl-2,6-octadienal-R-(-)-3,7-dimethyl-1,6-octadien-3-yl-acetal (neral-(-)-linalylacetal, Structure 6a) or a cis-3,7-dimethyl-2,6-octadienal-di(R-(-)-3,7-dimethyl-1,6-octadien-3-yl)-acetal (neral-di-(-)-linalylacetal, Structure 5b).
19. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a cis-3,7-dimethyl-2,6-octadienal-cis-3,7-dimethyl-2,6-octadienyl-acetal (neral nerylacetal, Structure 7a) or a cis-3,7-dimethyl-2,6-octadienal-di(cis-3,7-dimethyl-2,6-octadienyl)-acetal (neral dinerylacetal, Structure 7b).
20. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a trans-3,7-dimethyl-2,6-octadienal-trans-3,7-dimethyl-2,6-octadienyl-acetal (geranial geranylacetal, Structure 8a) or a trans-3,7-dimethyl-2,6-octadienal-di(trans-3,7-dimethyl-2,6-octadienyl)-acetal (geranial digeranylacetal, Structure 8b).
21. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a trans-3,7-dimethyl-2,6-octadienal-R-(-)-3,7-dimethyl-1,6-octadien-3-yl-acetal (geranial-(-)-linalylacetal, Structure 9a) or a trans-3,7-dimethyl-2,6-octadienal-di(R-(-)-3,7-dimethyl-1,6-octadien-3-yl)-acetal (geranial di-(-)-linalylacetal, Structure 9b).

22. Insect repellent or use according to Claim 12, wherein the octadienal octadienylacetal is a trans-3,7-dimethyl-2,6-octadienal-cis-3,7-dimethyl-2,6-octadienyl-acetal (geranial nerylacetal, Structure 10a) or a trans-3,7-dimethyl-2,6-octadienal-di(cis-3,7-dimethyl-2,6-octadienyl)-acetal (geranial dinerylacetal, Structure 10b).
23. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an R-(+)-3,7-dimethyl-6-octenal-trans-3,7-dimethyl-2,6-octadienyl-acetal ((+)-citronellal geranylacetal, Structure 11a) or an R-(+)-3,7-dimethyl-6-octenal-di(trans-3,7-dimethyl-2,6-octadienyl)-acetal ((+)-citronellal digeranylacetal, Structure 11b).
24. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an R-(+)-3,7-dimethyl-6-octenal-R-(-)-3,7-dimethyl-1,6-octadien-3-yl-acetal ((+)-citronellal-(-)-linalylacetal, Structure 12a) or an R-(+)-3,7-dimethyl-6-octenal-di(R-(-)-3,7-dimethyl-1,6-octadien-3-yl)-acetal ((+)-citronellal di-(-)-linalylacetal, Structure 12b).
25. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an R-(+)-3,7-dimethyl-6-octenal-cis-3,7-dimethyl-2,6-octadienyl-acetal ((+)-citronellal nerylacetal, Structure 13a) or an R-(+)-3,7-dimethyl-6-octenal-di(cis-3,7-dimethyl-2,6-octadienyl)acetal ((+)-citronellal dinerylacetal, Structure 13b).
26. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an S-(-)-3,7-dimethyl-6-octenal-trans-3,7-dimethyl-2,6-octadienyl-acetal ((-)-citronellal geranylacetal, Structure 14a) or an S-(-)-3,7-dimethyl-6-octenal-di(trans-3,7-dimethyl-2,6-octadienyl)-acetal ((-)-citronellal digeranylacetal, Structure 14b).
27. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an S-(-)-3,7-dimethyl-6-octenal-R-(-)-3,7-dimethyl-1,6-octadien-3-yl-acetal ((-)-

citronellal-(-)-linalylacetal, Structure 15a) or an S-(-)-3,7-dimethyl-6-octenal-di(R-(-)-3,7-dimethyl-1,6-octadien-3-yl)-acetal ((-)-citronellal di-(-)-linalylacetal, Structure 15b).

28. Insect repellent or use according to Claim 12, wherein the octenal octadienylacetal is an S-(-)-3,7-dimethyl-6-octenal-cis-3,7-dimethyl-2,6-octadienyl-acetal ((-)-citronellal nerylacetal, Structure 16a) or an S-(-)-3,7-dimethyl-6-octenal-di(cis-3,7-dimethyl-2,6-octadienyl)acetal ((-)-citronellal dinerylacetal, Structure 16b).
29. Insect repellent or use according to Claim 12, wherein the octenal octenylacetal is an R-(+)-3,7-dimethyl-6-octenal-R-(+)-3,7-dimethyl-6-octenyl-acetal ((+)-citronellal-(+)-citronellylacetal, Structure 17a) or an R-(+)-3,7-dimethyl-6-octenal-di(R-(+)-3,7-dimethyl-6-octenyl)-acetal ((+)-citronellal di-(+)-citronellylacetal, Structure 17b).
30. Insect repellent or use according to Claim 12, wherein the octenal octenylacetal is an R-(+)-3,7-dimethyl-6-octenal-S-(-)-3,7-dimethyl-6-octenyl-acetal ((+)-citronellal-(-)-citronellylacetal, Structure 18a) or an R-(+)-3,7-dimethyl-6-octenal-di(S-(-)-3,7-dimethyl-6-octenyl)-acetal ((+)-citronellal di-(-)-citronellylacetal, Structure 18b).
31. Insect repellent or use according to Claim 12, wherein the octenal octenylacetal is an S-(-)-3,7-dimethyl-6-octenal-R-(+)-3,7-dimethyl-6-octenyl-acetal ((-)-citronellal-(+)-citronellylacetal, Structure 19a) or an S-(-)-3,7-dimethyl-6-octenal-di(R-(+)-3,7-dimethyl-6-octenyl)-acetal ((-)-citronellal di-(+)-citronellylacetal, Structure 19b).
32. Insect repellent or use according to Claim 12, wherein the octenal octenylacetal is an S-(-)-3,7-dimethyl-6-octenal-S-(-)-3,7-dimethyl-6-octenyl-acetal ((-)-citronellal-(-)-citronellylacetal, Structure 20a) or an S-(-)-3,7-dimethyl-6-octenal-di(S-(-)-3,7-dimethyl-6-octenyl)-acetal ((-)-citronellal di-(-)-citronellylacetal, Structure 20b).

33. Insect repellent or use according to Claim 12, wherein the octadienal octenylacetal is a cis-3,7-dimethyl-2,6-octadienal-R-(+)-3,7-dimethyl-6-octenyl-acetal (neral-(+)-citronellylacetal, Structure 21a) or a cis-3,7-dimethyl-2,6-octadienal-di(R-(+)-3,7-dimethyl-6-octenyl)-acetal (neral di(+)-citronellyl acetal, Structure 21b).
34. Insect repellent or use according to Claim 12, wherein the octadienal octenylacetal is a trans-3,7-dimethyl-2,6-octadienal-R-(+)-3,7-dimethyl-6-octenyl-acetal (geranial-(+)-citronellylacetal, Structure 22a) or a trans-3,7-dimethyl-2,6-octadienal-di(R-(+)-3,7-dimethyl-6-octenyl)-acetal (geranial di(+)-citronellyl acetal, Structure 22b).
35. Insect repellent or use according to Claim 12, wherein the octadienal octenylacetal is a cis-3,7-dimethyl-2,6-octadienal-S-(-)-3,7-dimethyl-6-octenyl-acetal (neral-(-)-citronellylacetal, Structure 23a) or a cis-3,7-dimethyl-2,6-octadienal-di(S-(-)-3,7-dimethyl-6-octenyl)-acetal (neral di(-)-citronellyl acetal, Structure 23b).
36. Insect repellent or use according to Claim 12, wherein the octadienal octenylacetal is a trans-3,7-dimethyl-2,6-octadienal-S-(-)-3,7-dimethyl-6-octenyl-acetal (geranial-(-)-citronellylacetal, Structure 24a) or a trans-3,7-dimethyl-2,6-octadienal-di(S-(-)-3,7-dimethyl-6-octenyl)-acetal (geranial di(-)-citronellyl acetal, Structure 24b).
37. Insect repellent or use according to Claim 12, wherein the octadienal-p-menthenylacetal is a cis-3,7-dimethyl-2,6-octadienal-R-(+)-p-menth-1-en-8-yl-acetal (neral-(+)-terpinyl acetal, Structure 25a) or a cis-3,7-dimethyl-2,6-octadienal-di(R-(+)-p-menth-1-en-8-yl)-acetal (neral di(+)-terpinyl acetal, Structure 25b).
38. Insect repellent or use according to Claim 12, wherein the octadienal-p-menthenylacetal is a trans-3,7-dimethyl-2,6-octadienal-R-(+)-p-menth-1-en-8-yl-acetal (geranial-(+)-terpinyl acetal, Structure 26a) or a trans-3,7-dimethyl-2,6-octadienal-di(R-(+)-p-menth-1-en-8-yl)-acetal (geranial di(+)-terpinyl acetal, Structure 26b).

39. Insect repellent or use according to Claim 12, wherein the octadienal-p-menthenylacetal is a cis-3,7-dimethyl-2,6-octadienal-S-(-)-p-menth-1-en-8-yl-acetal (neral-(-)-terpinyl acetal, Structure 27a) or a cis-3,7-dimethyl-2,6-octadienal-di(S-(-)-p-menth-1-en-8-yl)-acetal (neral di(-)-terpinyl acetal, Structure 27b).
40. Insect repellent or use according to Claim 12, wherein the octadienal-p-menthenylacetal is a trans-3,7-dimethyl-2,6-octadienal-S-(-)-p-menth-1-en-8-yl-acetal (geranial-(-)-terpinyl acetal, Structure 28a) or a trans-3,7-dimethyl-2,6-octadienal-di(S-(-)-p-menth-1-en-8-yl)-acetal (geranial di(-)-terpinyl acetal, Structure 28b).
41. Insect repellent or use according to Claim 12, wherein the octenal-p-menthenylacetal is an R-(+)-3,7-dimethyl-6-octenal-R-(+)-p-menth-1-en-8-yl-acetal ((+)-citronellal-(+)-terpinyl acetal, Structure 29a) or an R-(+)-3,7-dimethyl-6-octenal-di(R-(+)-p-menth-1-en-8-yl)-acetal ((+)-citronellal di(+)-terpinyl acetal, Structure 29b).
42. Insect repellent or use according to Claim 12, wherein the octenal-p-menthenylacetal is an R-(+)-3,7-dimethyl-6-octenal-S-(-)-p-menth-1-en-8-yl-acetal ((+)-citronellal(-)-terpinyl acetal, Structure 30a) or an R-(+)-3,7-dimethyl-6-octenal-di(S-(-)-p-menth-1-en-8-yl)-acetal ((+)-citronellal di(-)-terpinyl acetal, Structure 30b).
43. Insect repellent or use according to Claim 12, wherein the octenal-p-menthenylacetal is an S-(-)-3,7-dimethyl-6-octenal-R-(+)-p-menth-1-en-8-yl-acetal ((-)-citronellal-(+)-terpinyl acetal, Structure 31a) or an S-(-)-3,7-dimethyl-6-octenal-di(R-(+)-p-menth-1-en-8-yl)-acetal ((-)-citronellal di(+)-terpinyl acetal, Structure 31b).
44. Insect repellent or use according to Claim 12, wherein the octenal-p-menthenylacetal is an S-(-)-3,7-dimethyl-6-octenal-S-(-)-p-menth-1-en-8-yl-acetal ((-)-citronellal(-)-terpinyl acetal, Structure 32a) or an S-(-)-3,7-dimethyl-6-octenal-di(S-(-)-p-menth-1-en-8-yl)-acetal ((-)-citronellal di(-)-terpinyl acetal, Structure 32b).

45. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxane is a 2-(cis-2,6-dimethyl-1,5-heptadienyl)-5-hydroxy-1,3-dioxane (neral-1,3-glyceryl-acetal, Structure 33).
46. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxane is a 2-(trans-2,6-dimethyl-1,5-heptadienyl)-5-hydroxy-1,3-dioxane (geranial-1,3-glyceryl-acetal, Structure 34).
47. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxane is a 2-(R-(+)-2,6-dimethyl-5-heptenyl)-5-hydroxy-1,3-dioxane ((+)-citronellal-1,3-glyceryl-acetal, Structure 35).
48. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxane is a 2-(S-(-)-2,6-dimethyl-5-heptenyl)-5-hydroxy-1,3-dioxane ((-)-citronellal-1,3-glyceryl-acetal, Structure 36).
49. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxol is a 2-(cis-2,6-dimethyl-1,5-heptadienyl)-4-hydroxymethyl-1,3-dioxol (neral-1,2-glyceryl-acetal, Structure 37).
50. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxol is a 2-(trans-2,6-dimethyl-1,5-heptadienyl)-4-hydroxymethyl-1,3-dioxol (geranial-1,2-glyceryl-acetal, Structure 38).
51. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxol is a 2-(R-(+)-2,6-dimethyl-5-heptenyl)-4-hydroxymethyl-1,3-dioxol ((+)-citronellal-1,2-glyceryl-acetal, Structure 39).

52. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxol is a 2-(S-(-)-2,6-dimethyl-5-heptenyl)-4-hydroxymethyl-1,3-dioxol ((-)-citronellal-1,2-glyceryl-acetal, Structure 40).
53. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxol is a 2-(cis-2,6-dimethyl-1,5-heptadienyl)-1,3-dioxol (neral ethylene acetal, Structure 41).
54. Insect repellent or use according to Claim 12, wherein the 2-heptadienyl-1,3-dioxol is a 2-(trans-2,6-dimethyl-1,5-heptadienyl)-1,3-dioxol (geranial ethylene acetal, Structure 42).
55. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxol is a 2-(R-(+)-2,6-dimethyl-5-heptenyl)-1,3-dioxol ((+)-citronellal ethylene acetal, Structure 43).
56. Insect repellent or use according to Claim 12, wherein the 2-heptenyl-1,3-dioxol is a 2-(S-(-)-2,6-dimethyl-5-heptenyl)-1,3-dioxol ((-)-citronellal ethylene acetal, Structure 44).
57. Insect repellent or use according to one of the above claims, containing also a saturated or unsaturated, aliphatic carboxylic acid C1 - C12, especially preferably octanoic acid (caprylic acid) and decanoic acid (capric acid).
58. Insect repellent or use according to one of the above claims, containing also a benzoate, preferably trans-3,7-dimethyl-2,6-octadienyl benzoate (geranyl benzoate, Structure 45), cis-3,7-dimethyl-2,6-octadienyl benzoate (neryl benzoate, Structure 46), R-(-)-3,7-dimethyl-1,6-octadien-3-yl benzoate ((-)-linalyl benzoate, Structure 47), R-(+)-p-menth-1-en-8-yl benzoate ((+)-terpinyl benzoate, 48), S-(-)-p-menth-1-en-8-yl benzoate ((-)-terpinyl benzoate, 49), R-(+)-3,7-dimethyl-6-octenyl benzoate ((+)-

citronellyl benzoate, 50), S-(-)-3,7-dimethyl-6-octenyl benzoate ((-)-citronellyl benzoate, 51) or free benzoic acid or a mixture of these compounds.

59. Insect repellent or use according to one of the above claims, also containing a p-mentha-3,8-diol, preferably cis-p-mentha-3,8-diol (cis-isopulegol hydrate, Structure 52) or trans-p-mentha-3,8-diol (trans-isopulegol hydrate, Structure 53) or a mixture of them.
60. Insect repellent or use according to one of the above claims, also containing a hydroxy octanal, preferably R-(+)-3,7-dimethyl-7-hydroxy octanal ((+)-citronellal hydrate, Structure 54) or an S-(-)-3,7-dimethyl-7-hydroxy octanal ((-)-citronellal hydrate, Structure 55) or a mixture of them.
61. Insect repellent or use according to one of the above claims, also containing (2[±],4aR[±],7R,8aR[±], -2-((R)-2,6-dimethylhept-5-enyl)-4,4,7-trimethylhexahydrobenzo[1,3]dioxin (trans-(+)-citronellal-p-mentha-3,8-diylacetal, Structure 56) or (2[±],4aR[±],7R,8aS[±], -2-((R)-2,6-dimethylhept-5-enyl)-4,4,7-trimethylhexahydrobenzo[1,3]dioxin (cis-(+)-citronellal-p-mentha-3,8-diylacetal, Structure 57) or (2[±],4aR[±],7R,8aR[±], -2-((S)-2,6-dimethylhept-5-enyl)-4,4,7-trimethylhexahydrobenzo[1,3]dioxin (trans-(-)-citronellal-p-mentha-3,8-diylacetal, Structure 58) or (2[±],4aR[±],7R,8aS[±], -2-((S)-2,6-dimethylhept-5-enyl)-4,4,7-trimethylhexahydrobenzo[1,3]dioxin (cis-(-)-citronellal-p-mentha-3,8-diylacetal, Structure 59) or containing a mixture of them.